

- AC CURRENT  
OSCILLOSCOPE PROBE

# SR661



# Statement of Compliance

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Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments certifies that this instrument has been calibrated using standards and instruments traceable to international standards.

We guarantee that at the time of shipping your instrument has met its published specifications.

**An NIST traceable certificate may be requested at the time of purchase, or obtained by returning the instrument to our repair and calibration facility, for a nominal charge.**

The recommended calibration interval for this instrument is 12 months and begins on the date of receipt by the customer. For recalibration, please use our calibration services. Refer to our repair and calibration section at [www.aemc.com](http://www.aemc.com).

**Serial #:** \_\_\_\_\_

**Catalog #:** 2113.49

**Model #:** SR661

Please fill in the appropriate date as indicated:

Date Received: \_\_\_\_\_

Date Calibration Due: \_\_\_\_\_



**AEMC®**  
INSTRUMENTS

Chauvin Arnoux®, Inc.  
d.b.a AEMC® Instruments  
[www.aemc.com](http://www.aemc.com)

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# INTRODUCTION



**The safety warnings are provided to ensure the safety of personnel and proper operation of the instrument. Read the instruction completely.**

- Use caution on any circuit: potentially high voltages and currents may be present and may pose a shock hazard.
- Do not use the probe if damaged. Always connect the current probe to the measuring device before it is connected around the conductor
- Do not use on non insulated conductor with a potential to ground greater than 600V CAT III pollution 2. Use extreme caution when clamping around bare conductors or bus bars.
- Before each use, inspect the probe; look for cracks in housing or output cable insulation.
- Do not use clamp in wet environment or in locations that hazardous gases exist.
- Do not use the probe anywhere beyond the tactile barrier.

## 1.1 International Electrical Symbols

	This symbol signifies that the instrument is protected by double or reinforced insulation.
	This symbol on the instrument indicates a WARNING and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.
	Risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.
	This symbol refers to a type A current sensor. This symbol signifies that application around and removal from HAZARDOUS LIVE conductors is permitted.
	Probe fitted with an electronic output limiter providing protection against voltage surges caused by the accidental opening of the probe secondary circuit to 30V max. peak.
	In conformity with WEEE 2002/96/EC.

## 1.2 Definition of Measurement Categories

- CAT I:** For measurements on circuits not directly connected to the AC supply wall outlet such as protected secondaries, signal level, and limited energy circuits.
- CAT II:** For measurements performed on circuits directly connected to the electrical distribution system. Examples are measurements on household appliances or portable tools.
- CAT III:** For measurements performed in the building installation at the distribution level such as on hardwired equipment in fixed installation and circuit breakers.
- CAT IV:** For measurements performed at the primary electrical supply (<1000V) such as on primary overcurrent protection devices, ripple control units, or meters.

## 1.3 Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. Notify your distributor of any missing items. If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once, giving a detailed description of any damage. Save the damaged packing container to substantiate your claim.

**1.4     Ordering Information**

AC Current Oscilloscope Probe Model SR661 ..... **Cat. #2113.49**  
*Includes a user manual and a product warranty and registration card.*

**1.4.1     Accessories and Replacement Parts**

Male Banana - Female BNC Adaptor (XF-SS) ..... **Cat. #2111.32**

# **PRODUCT FEATURES**

## **2.1 Description**

The AC Current Oscilloscope Probe Model SR661 expands oscilloscope applications in industrial or power environments, and is ideal for analysis and measurement of distorted current waveforms and harmonics.

The Model SR661 permits accurate display and measurement of currents from 100mA to 1000Arms, 1Hz to 100kHz (with current derating) without breaking into the circuit. A passive filter eliminates noise, ring on rapid rising (di/dt) waveforms, and ensures accurate screen displays.

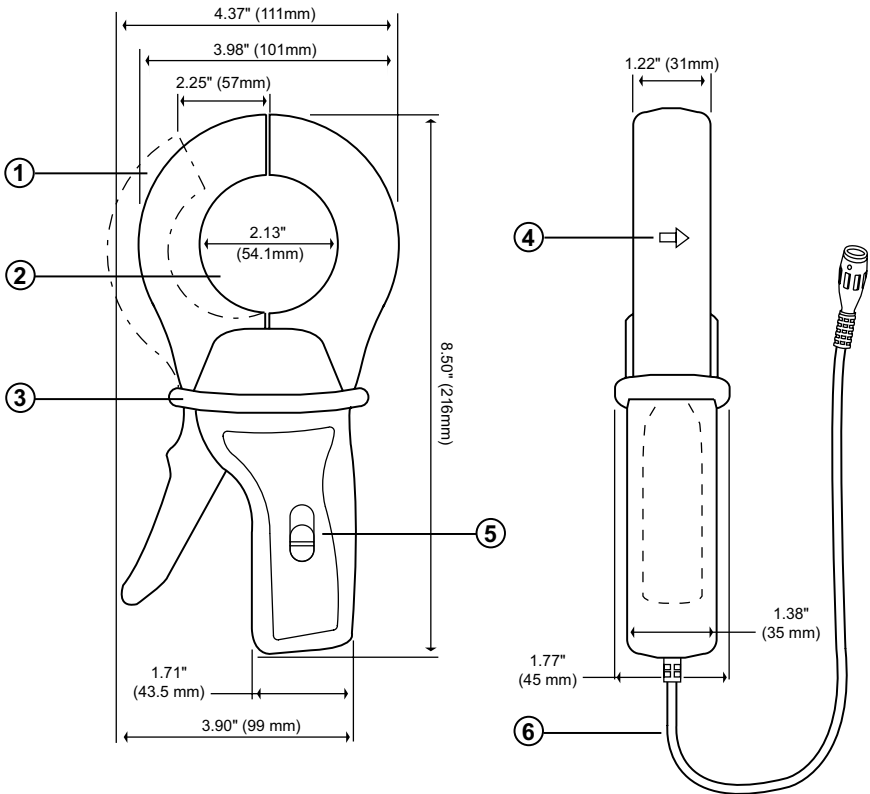
The probe connects directly to an oscilloscope through an insulated coaxial cable with an insulated BNC.

## **2.2 Compatibility**

The Model SR661 is compatible with any analog or digital oscilloscope or other voltage-measuring instrument which has the following features:

- BNC input connector
- Range capable of displaying 0.2 to 0.5V per division, or 2V range
- Minimum input impedance of 1M $\Omega$

## 2.3 Features



1. Jaw opening of 2.25"
2. Maximum dimension of conduct is 2.13" (54mm)
3. Tactical Barrier. Always keep hands below this barrier at all times.
4. Arrow indicates direction of current flow. Current flows in a positive direction when it travels from supply to load.
5. Three position switch
6. 6.5 ft (2m) output cable



# **SPECIFICATIONS**

## **3.1 Electrical Specifications**

\*Reference conditions: 23°C ± 3°K, 20 to 75% RH, 48 to 65Hz, external magnetic field <40A/m, no DC component, no external current carrying conductor, test sample centered.

**Operating Range:** 0.1 to 2000A peak

**Measurement Range:** 100mA to 1200Arms (2000A peak)

**Output Signal:** mV output signal (2V peak max)

100mV/A: 10mA to 20A peak

10mV/A: 0.1A to 200A peak

1mV/A: 1A to 2000A peak

**1mV/A, (1V at 1000A)**

Range	Accuracy	Phase Shift
1 to 50A	$\leq 1\% \pm 1\text{mV}$	N/A
50 to 200A		$\leq 3^\circ$
200 to 1000A		$\leq 2^\circ$
1000 to 1200A		$\leq 1^\circ$

**Overload:** 1200 A for 40 mn ON, 20 mn OFF

**10 mV/A, (1V at 100A)**

Range	Accuracy	Phase Shift
0.1 to 5A	$\leq 2\% \pm 5\text{mV}$	N/A
5 to 20A		$\leq 15^\circ$
20 to 100A		$\leq 10^\circ$
100 to 120A		$\leq 5^\circ$

**Overload:** 120 A continuous

**100mV/A, (1V at 10 Arms)**

Range	Accuracy	Phase Shift
0.1 to 0.5A	$\leq 3\% \pm 10\text{mV}$	N/A
0.5 to 2A		N/A
2 to 10A		$\leq 15^\circ$
10 to 12A		

**Overload:** 12 A continuous

**Frequency Range (with current derating):**

1Hz to 100kHz (@ -3dB)

See typical response curves (pages 10-11)

**Crest Factor:**  $\leq 6$

**Load Impedance:**  $\geq 1\text{M}\Omega$  @  $\leq 47\text{pF}$

**Rise/Fall Time:**  $< 40\mu\text{S}$

**Working Voltage:** 600V CAT III

**Common Mode Voltage:** 600V CAT III

**Influence of Adjacent Conductor:**  $< 0.2\text{mA/AAC}$

**Influence of Conductor Position in Jaw Opening:**

0.02% of Reading under 400Hz

**Influence of Frequency:**

Range 1mV/A:      From 10 to 1000 Hz:  $< 1\%$  of Reading  
                            From 1 to 10kHz:  $< 2\%$  of Reading  
                            From 10 to 50kHz:  $< 10\%$  of Reading  
                            From 50 to 100kHz: - 3 dB

Range 10mV/A:    From 10 to 1000 Hz:  $< 5\%$  of Reading  
                            From 1 to 10kHz:  $< 3\%$  of Reading  
                            From 10 to 50kHz:  $< 20\%$  of Reading  
                            From 50 to 100kHz: - 3 dB

Range 100mV/A:   From 10 to 1000Hz:  $< 10\%$  of Reading  
                            From 1 to 10kHz:  $< 5\%$  of Reading  
                            From 10 to 50kHz:  $< 20\%$  of Reading  
                            From 50 to 100kHz: - 3 dB

## 3.2 Mechanical Specifications

**Dimensions:** 4.4 x 8.5 x 1.8" (111 x 216 x 45 mm)

**Weight:** 1.21 lbs (550g)

**Jaw Opening:** 2.25" (57mm) max

**Maximum Cable Diameter:** 2.13" (54mm)

**Maximum Conductor Size:**

Cable: 2.05" (52mm)

Bus Bar: 1.95 x .19" (50 x 5mm)

**Case Protection:** IP 40 (IEC 529)

**Drop Test:** 1m (IEC 68-2-32)

**Mechanical Shock:** 100g (IEC 68-2-27)

**Vibration:** 5 to 15Hz, 0.15mm (IEC 68-2-6)  
15 to 25Hz, 1mm  
25 to 55Hz, 0.25mm

**Output:** Insulated lead with insulated BNC Connector, 6ft (2 m)

### 3.3 Environmental Specifications

**Operating Temperature/RH:** 14° to 122°F (-10° to 50°C)

**Storage Temperature/RH:** -4° to 158°F (-20 to 70°C)

**Altitude:** Non-operating: 0 to 12,000 m  
Operating: 0 to 2000 m

**Operating Relative Humidity:** 0 to 85% @ 35°C

**Influence of Temperature:** ≤ 0.15% / 10K

**Influence of Humidity:** 10 to 90%: 0.1%

### 3.4 Safety Specifications



**Electrical:** Double insulation or reinforced insulation between the primary or secondary and the outer case of the handle per EN 61010-2-032.

600V, CAT III, Pollution Degree: 2

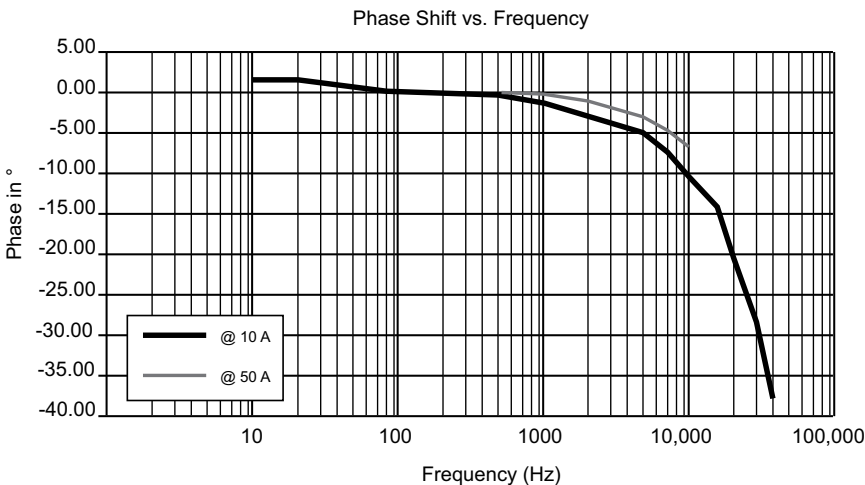
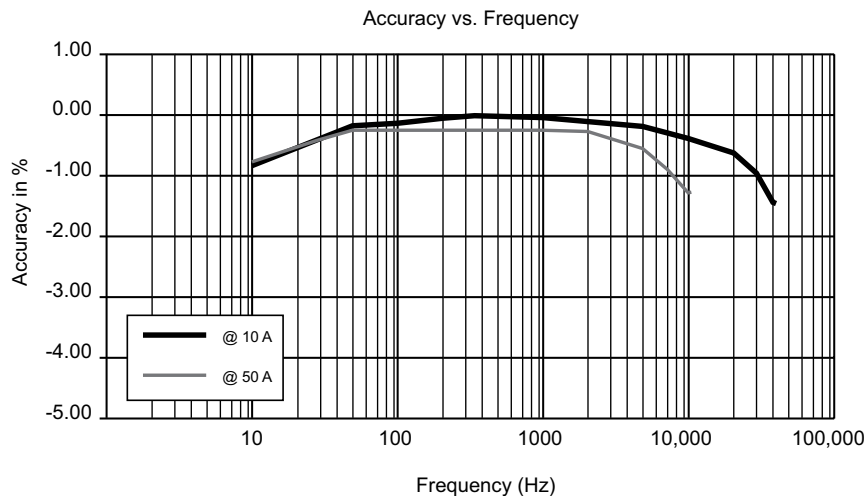
**Dielectric Strength:** 5550V, 50/60Hz between primary, secondary, and the outer case of the handle

**Electromagnetic Compatibility:** EN 50081-1 Class B  
EN 50082-2 Electrostatic discharge  
IEC 1000-4-2  
Radiated field IEC 1000-4-3  
Fast transients IEC 1000-4-4  
Magnetic field at 50/60 Hz IEC 1000-4-8

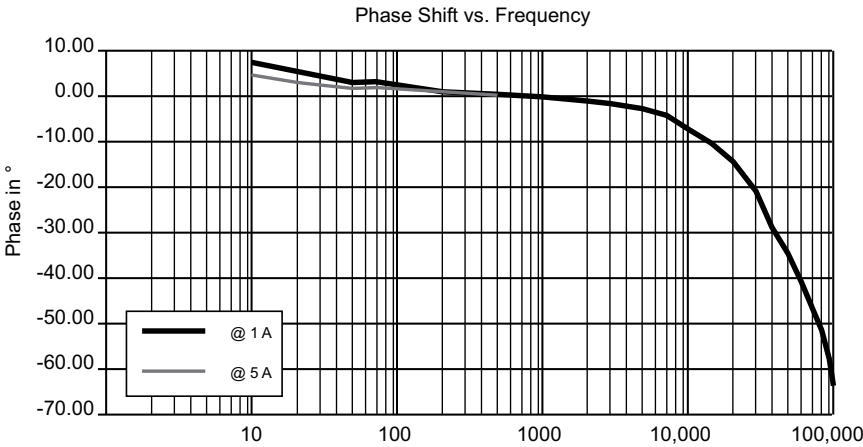
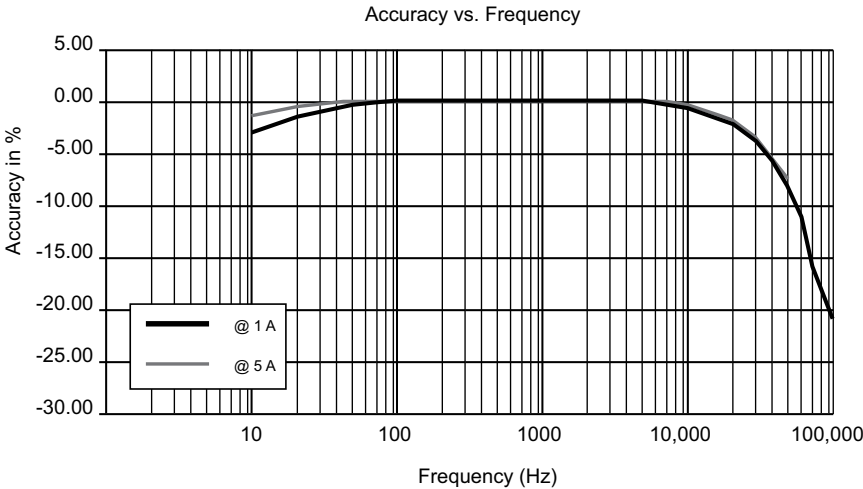
*\*Specifications are subject to change without notice*

### 3.5 Typical Response Curves

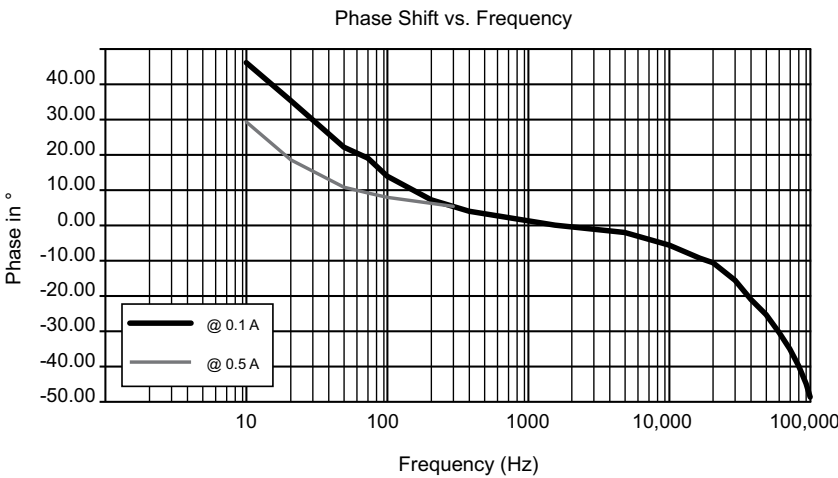
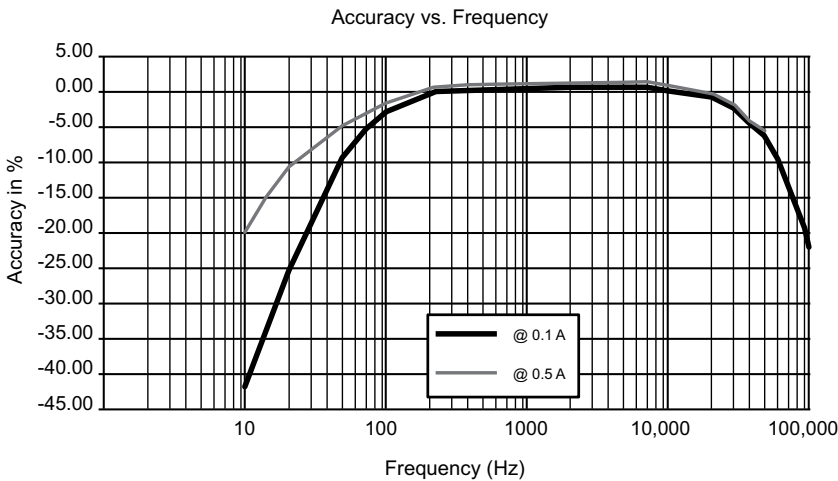
1mV/A Range:



10mV/A Range:



100mV/A Range:



# OPERATION

## 4.1 Current Measurement



**WARNING:** Always connect the probe to the instrument before clamping onto the circuit under test.

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- Connect the Model SR661 to the proper input channel on the oscilloscope.
- Begin with the least sensitive range on the current probe (1mV/A)
- Select the 0.5V/Division range on the oscilloscope.
- Clamp the probe on the conductor to be measured and read the current flowing directly on your oscilloscope.

***(Remember to unclamp the probe from the conductor before disconnecting it from your meter or instrument.)***

You may also use your oscilloscope to amplify the signal while using the 1mV/A probe range (which offers the best accuracy and least phase shift).



**NOTE:** It is possible to change the range on the current probe without removing the probe from the current carrying conductor, but it is important to remember not to exceed the permissible peak ratings of 2000mV peak or 4000 mV peak to peak maximum. The peak ratings by range are: 20A peak @ 100mV/A, 200A peak @ 10mV/A and 2000A peak @ 1mV/A.

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# **MAINTENANCE**

## **5.1 Maintenance**



### **WARNING**

- To ensure optimum performance, it is important to keep the probe jaw mating surfaces clean at all times. Failure to do so may result in error in readings.
- For maintenance use only specified factory replacement parts.
- To avoid electrical shock, do not attempt to perform any servicing unless you are qualified to do so.
- To avoid electrical shock and/or damage to the instrument, do not allow water or other foreign substances into the case.
- Disconnect the unit from all circuits and test cables before opening the case.
- Use caution with metallic tools that may short battery packs, power supplies, etc.

## **5.2 Cleaning**

- To clean the probe body, use a soft cloth dampened in a solution of mild detergent and water. To clean the core, open the jaw and clean the exposed core surfaces with a cotton swab dampened with isopropyl alcohol (isopropanol) or ethyl alcohol (fotocol or ethanol). Lubricate the jaws mating surfaces with a light oil.
- Do not use chemicals containing benzine, benzene, toluene, xylene, acetone, or similar solvents.
- Do not immerse the probe in liquids or use abrasive cleaners.



## **Repair and Calibration**

To ensure that your instrument meets factory specifications, we recommend that it be scheduled back to our factory Service Center at one-year intervals for recalibration, or as required by other standards or internal procedures.

### **For instrument repair and calibration:**

You must contact our Service Center for a Customer Service Authorization Number (CSA#). This will ensure that when your instrument arrives, it will be tracked and processed promptly. Please write the CSA# on the outside of the shipping container. If the instrument is returned for calibration, we need to know if you want a standard calibration, or a calibration traceable to N.I.S.T. (Includes calibration certificate plus recorded calibration data).

**Ship To:** Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
15 Faraday Drive  
Dover, NH 03820 USA  
Phone: (800) 945-2362 (Ext. 360)  
(603) 749-6434 (Ext. 360)  
Fax: (603) 742-2346 or (603) 749-6309  
E-mail: [repair@aemc.com](mailto:repair@aemc.com)

(Or contact your authorized distributor)

Costs for repair, standard calibration, and calibration traceable to N.I.S.T. are available.

**NOTE: You must obtain a CSA# before returning any instrument.**

## **Technical and Sales Assistance**

If you are experiencing any technical problems, or require any assistance with the proper operation or application of your instrument, please call, mail, fax or e-mail our technical support team:

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
200 Foxborough Boulevard  
Foxborough, MA 02035 USA  
Phone: (800) 343-1391  
(508) 698-2115  
Fax: (508) 698-2118  
E-mail: [techsupport@aemc.com](mailto:techsupport@aemc.com)  
[www.aemc.com](http://www.aemc.com)

**NOTE: Do not ship Instruments to our Foxborough, MA address.**

## **Limited Warranty**

The AC Current Oscilloscope Probe Model SR661 is warranted to the owner for a period of one year from the date of original purchase against defects in manufacture. This limited warranty is given by AEMC® Instruments, not by the distributor from whom it was purchased. This warranty is void if the unit has been tampered with, abused or if the defect is related to service not performed by AEMC® Instruments.

**For full and detailed warranty coverage, please read the Warranty Coverage Information, which is attached to the Warranty Registration Card (if enclosed) or is available at [www.aemc.com](http://www.aemc.com). Please keep the Warranty Coverage Information with your records.**

### **What AEMC® Instruments will do:**

If a malfunction occurs within the one-year period, you may return the instrument to us for repair, provided we have your warranty registration information on file or a proof of purchase. AEMC® Instruments will, at its option, repair or replace the faulty material.

**REGISTER ONLINE AT:  
[www.aemc.com](http://www.aemc.com)**

## **Warranty Repairs**

### **What you must do to return an Instrument for Warranty Repair:**

First, request a Customer Service Authorization Number (CSA#) by phone or by fax from our Service Department (see address below), then return the instrument along with the signed CSA Form. Please write the CSA# on the outside of the shipping container. Return the instrument, postage or shipment pre-paid to:

**Ship To:** Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
15 Faraday Drive • Dover, NH 03820 USA  
Phone: (800) 945-2362 (Ext. 360)  
(603) 749-6434 (Ext. 360)  
Fax: (603) 742-2346 or (603) 749-6309  
E-mail: [repair@aemc.com](mailto:repair@aemc.com)

**Caution:** To protect yourself against in-transit loss, we recommend you insure your returned material.

**NOTE:** You must obtain a CSA# before returning any instrument.

**Notes:**

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**[www.aemc.com](http://www.aemc.com)**